

ABSTRACT OF THE DISCLOSURE

The invention provides a super hard and tough, nano-crystal austenite steel bulk material having an improved corrosion resistance, and its preparation process.

5 The austenite steel bulk material comprises an aggregate of austenite nano-crystal grains containing 0.1 to 2.0% (by mass) of a solid solution type nitrogen, wherein an oxide, nitride, carbide or the like of a metal or semimetal exists as a crystal grain growth inhibitor
10 between and/or in said nano-crystal grains.

For preparation, fine powders of austenite steel-forming components, i.e., iron and chromium, nickel, manganese, carbon or the like are mixed with a substance that becomes a nitrogen source. Mechanical alloying (MA) 15 is applied to the mixture, thereby preparing nano-crystal austenite steel powders having a high nitrogen concentration. Finally, the austenite steel powders are consolidated by sintering by means of spark plasma sintering, rolling or the like.